(No Model.)

E. F. MORSE.

DRIVE CHAIN.

No. 592,552. Patented Oct. 26, 1897.

Fig. 1.

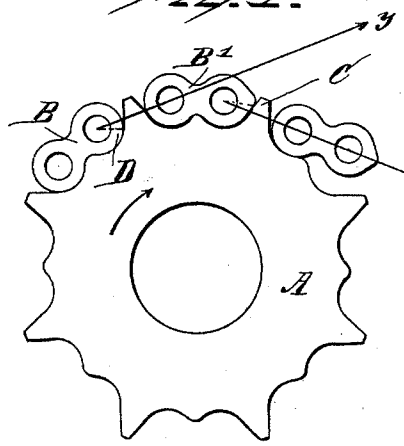


Fig. 2.

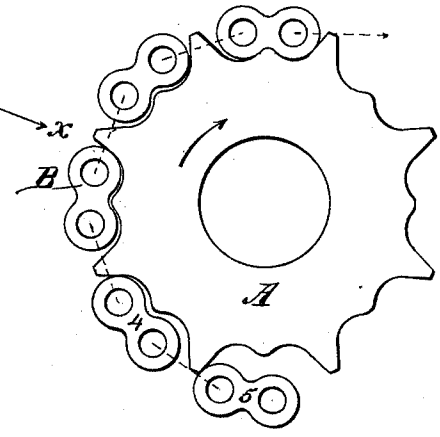


Fig. 3.

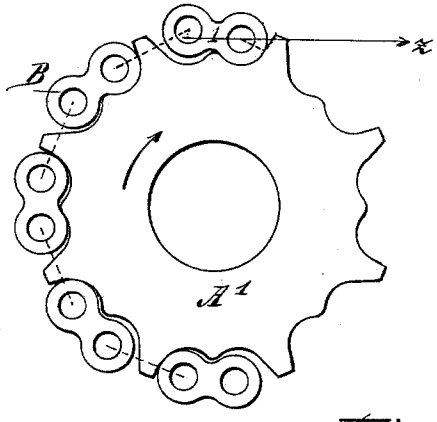


Fig. 4.

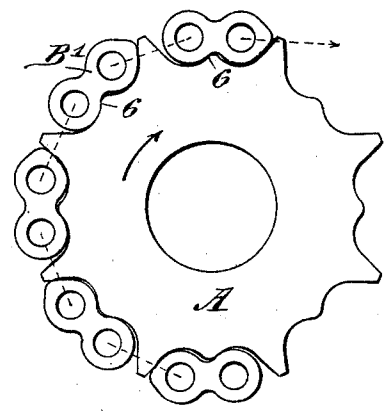
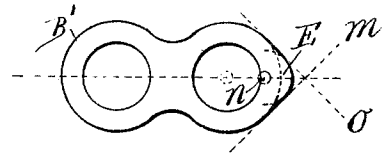


Fig. 5.



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UNITED STATES PATENT OFFICE.

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DRIVE-CHAIN.

SPECIFICATION forming part of Letters Patent No. 592,552, dated October 26, 1897.

Application filed November 19, 1896. Serial No. 612,679. (No model.)

To all whom it may concern:

Be it known that I, EVERETT F. MORSE, a citizen of the United States, and a resident of Trumansburg, in the county of Tompkins and State of New York, have invented a certain new and useful Improvement in Drive-Chains, of which the following is a specification.

This invention relates to an improvement in drive-chains for general transmission of power, though in setting it forth reference will be especially made to such chains used for velocipede propulsion.

The main difficulty encountered in chain-driving, particularly on road-vehicles, is that of providing for easy and smooth running of the chain under the varying conditions attendant upon the use of such vehicles. Chains will generally run all right when they and the sprocket-wheels are clean or well lubricated, but as soon as they become wet and gritty or dry for want of lubricant they snap and bind and run hard. If the sprocket-teeth are so cut that the chain will run smoothly under the latter conditions, then under the former conditions the chain will creep ahead on the driven sprocket-wheel and create trouble, friction, and noise in the entrance of the chain upon the wheel. This invention overcomes all these difficulties, and to that end it consists in the construction and formation of parts hereinafter fully described, and set forth in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 represents the old and the improved forms of bearing-block or central link, and diagrammatically illustrates the differences in the action thereof upon the teeth of a sprocket-wheel. Fig. 2 represents the action of the old form of chain upon an ordinary sprocket-wheel when all parts are clean or well lubricated. Fig. 3 represents the old form of chain on a sprocket-wheel with the teeth less slanting than in Fig. 2 to prevent the chain from crawling on the wheel. Fig. 4 represents the improved form of chain on the ordinary sprocket-wheel, such as shown in Fig. 2. Fig. 5 is an enlarged detail view.

A indicates the ordinary driven sprocket-wheel, while A′ represents a driven sprocket-wheel with the teeth less slanting.

B indicates the old form of central link or block, which has a round or cylindrical end, while B′ represents the improved block, which has its bearing end bluntly pointed or provided with a slightly-rounded extension. The darts on the sprocket-wheels denote the direction of rotation.

For greater clearness in illustration the side links of the chain have been omitted.

As above stated, the block B′ has its driving end provided with a blunt or rounded protuberance or point. This construction, as delineated in Fig. 1, throws the point of engagement between the block and sprocket-tooth out nearer the end of the tooth, as at C. It is intended that this point of bearing shall be coincident with or a little outside of the line of strain, which is represented by the dart *x*, the latter condition being here illustrated. The point of bearing being thus located, the block is made to hug the sprocket-wheel closely. It has no tendency to roll along the surface of the tooth. Any movement thereon must be a sliding one. In the same figure, at B, is shown the ordinary block whose point of engagement with the tooth is near the base thereof, as at D. This point lies below the line of strain, which is indicated by the dart *y*. Therefore the block has a constant tendency to roll up the tooth and so to raise the rear end from the wheel. The evils resulting from the use of this old form of block are graphically represented in Figs. 2 and 3. In the first place, if the teeth of the sprocket-wheel are cut sufficiently slanting to allow the chain to leave the wheel smoothly and without noise under all conditions then the blocks slide up the teeth and cause the chain to crawl upon the sprocket-wheel to such an extent that it has great difficulty in running onto the wheel, as indicated at the blocks 4 and 5, Fig. 2. Then if the bearing side of the teeth is made less slanting, as in Fig. 3, so as to prevent the crawling of the chain and provide for an easy entry thereof upon the wheel, a difficulty is met with in the chain leaving the wheel. The block, as 1, being prevented from sliding by the decreased angle of the tooth and having its point of engagement with the tooth below the line of strain, (indicated at Z,) it rolls on the tooth, thereby raising its rear end from the wheel. With

the old form of round-ended block this abrupt slant of the sprocket-teeth or any condition (such as wet and grit or lack of lubricant) which will create sufficient friction between the blocks and sprocket-teeth to prevent the one from sliding upon the other will cause the blocks to roll upon the teeth and so raise their rear ends from the wheel. Then as the sprocket-wheel is rotated and the front end of each block finally leaves the teeth the rear ends of the blocks which have been raised above the line of strain (see 1, Fig. 3) will snap down onto the wheel. This is the cause of that well-known snapping action so common to chain-driving and also the cause of the vibration of the chain. These effects add to the friction between the chain and wheel.

By constructing the central links or blocks with an extended or pointed bearing end, as above described, thereby causing them to bear upon the teeth nearer the outer end thereof, the strain upon the chain makes the blocks hug the wheel closely. They have no tendency to move up on the teeth and freely swing away from them in leaving the wheel. Then, too, each block under strain hugs the wheel, and so holds its place, and the blocks are free to enter their places as the chain runs onto the wheel. With this form of block a more slanting tooth can be used than with the old form of block, and no amount of wet and grit can cause the snapping, vibration, and binding which are unavoidable in the old form of chain. The block being made to hug the wheel, its middle notch more intimately engages the elevations 6 intermediate the teeth, thereby insuring a distribution of the frictional engagement of the chain upon said elevations and the teeth. The point of extension on the central link also acts as a reinforcement to the wearing-surface of said link. Of several forms of block tried, however, that found to give the best results is illustrated in Fig. 5. The projection or extension E represented is bounded by an arc whose radius is less than that of the body portion of the link, the center of said arc being at *n*, and by planes *m o*, which are tangential to the body portion of the link and to the arc and intersect at an angle of forty-five degrees the plane passing through the center of the link. If desired, the arc of extension E may intersect the body of the link and the angles so formed be left open instead of filling them out to the longitudinal planes *m o*.

The central links may be pointed on both ends, if desired, and the points may be varied in shape from that shown and they may be used on sprocket-wheels of different form from those illustrated without departing from the invention.

What I claim as my invention is—

1. In a sprocket-and-chain gear, a chain having a driving block or link provided with a projection which during strain engages the driven wheel at or above the line of strain thus avoiding the tendency of the rear end of the block or link to lift off the driven wheel.

2. In a drive-chain, a driving block or link provided with a projection on the end for engagement with the sprockets when the block is in position of rest upon the wheel, substantially as and for the purpose described.

3. In a drive-chain, a central link or driving block whose body portion has curved ends and which has an extension on one end whose periphery is an arc of less radius than the curved ends of the body portion of the block.

Signed at New York, in the county of New York and State of New York, this 11th day of November, A. D. 1896.

EVERETT F. MORSE.

Witnesses:
WM. H. CAPEL,
D. H. DECKER.